Report for 2002MS1B: Functional Assessment of Moist-Soil Management Impact on Wetland Impoundments Created as Part of an Agricultural Lands Reclamation Plan

- Conference Proceedings:
  - Ervin, G.N., J.T. Bried, B.D. Herman, and D.W. Schmitz, 2002, Assessing functional integrity of moist-soil managed wetlands by comparison with nearby non-managed systems. Proceedings of the 32nd Mississippi Water Resources Conference, April 23-24, 2002, Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, pages 242-252.
- Other Publications:
  - Ervin, G.N., J.T. Bried, B.D. Herman, and D.W. Schmitz, 2002, Assessing functional integrity of moist-soil managed wetlands by comparison with nearby non-managed systems. A poster was provided to the Strawberry Plains Audubon Center.

Report Follows:

PROBLEMS AND RESEARCH OBJECTIVES:

The proposed project will be conducted in cooperation with the National Audubon Society to evaluate effects of moist-soil habitat management practices on water quality and wetland function. The study site is part of a 1000-ha farm near Holly Springs, MS, presently undergoing conversion from agricultural land to wildlife habitat under the supervision of Audubon personnel. Mississippi State University was solicited as an institutional partner in examining the success of management practices and effects of habitat manipulations on environmental quality in this headwaters region of the Coldwater River.

This project will address Mississippi water research priorities by monitoring water quality, sedimentation, and biological community development in wetlands managed as habitat for local and migratory wildlife, in comparison to natural wetland ecosystems. The proposed research will evaluate effects of habitat management practices on nutrient and sediment removal, sediment accumulation, and plant community development in three artificial impoundments on lands currently under reclamation from more than 150 years of agricultural use. South Atlantic-Gulf Region priorities to be addressed also include water quality and management during the functional assessment of created and actively managed wetland impoundments. Standard monitoring techniques will be used to evaluate effects of facilities construction and biotic community development in reference to unimpacted natural wetlands located within the same

METHODOLOGY:

Strawberry Plains Audubon Center is a 1000-ha farm located in Holly Springs, MS that entered the care of Audubon in 1998 under its original owners' wishes that it be restored to a more natural landscape, with a focus on birds and other wildlife species. Part of the management plan of Strawberry Plains is the enhancement of riparian areas for bird and other wildlife use. In addition to a number of streams that make up a substantial portion of the Coldwater River headwaters, aquatic resources on the reserve include numerous farm ponds installed to aid in erosion control. Center managers plan to install or enhance water control structures along one major stream and around the two farm ponds in order to increase moist-soil resources for waterfowl and other aquatic animal species, such as amphibians, fish, and mammals.

The aim of moist-soil management is to recreate more-or-less natural hydrologic cycles in managed wetlands to increase the diversity and production of plant and animal species for wildlife food and habitat (Anderson and Smith, 2000). Under moist-soil manipulation, water levels are lowered during the growing season to stimulate seed germination of wetland-adapted plants and to increase the oxygenation of soils to stimulate plant productivity. In autumn, water levels are raised to discourage establishment of non-wetland plant species and increase habitat diversity for invertebrate animals that serve as food for waterfowl and other aquatic wildlife, in addition to seeds that are produced by the moist-soil plant community. These water level manipulations are often accompanied by soil manipulations, such as tilling or disking, that maintain high plant species diversity and high seed production for wildlife (Gray et al., 1999). Moist-soil management practices at Strawberry Plains will include mowing, tilling, and planting in shallow areas of each of three man-made impoundments to enhance early-successional herbaceous plant species for increased seed and invertebrate production.

SIGNIFICANCE:

Strawberry Plains Audubon Center managers installed water control structures in two areas to be managed as moist-soil habitat and repaired the levee on the third managed area. Water control structures were to be donated by Ducks Unlimited. Audubon has installed stage height gages in two of the six sites selected for continued monitoring during 2003-2004.

Monitoring data continue to be collected, at bi-monthly intervals for general field parameters, less frequently for other variables, such as suspended solids, chlorophyll, and nutrient concentrations. In addition to vegetation analyses, further biotic data are being collected on amphibians and macroinvertebrates during the 2003 field season. Audubon is purchasing four automated recorders for collecting data on amphibian use of the sites, and Brook Herman is collecting macroinvertebrate samples as part of her thesis research.

Results to date were presented in a poster at the annual Mississippi Water Resources meeting in April 2003, which also was submitted for publication in the Proceedings. The presentation was entitled, “Assessing functional integrity of moist-soil managed wetlands by comparison with nearby non-managed systems.”